COMMAND AND CONTROL OF MOBILITY FORCES: ANALYSIS OF THE ORGANIZATIONAL STRUCTURE

GRADUATE RESEARCH PROJECT

Jeffrey L. Hupy, Major, USAF

AFIT/GOM/LAC/99E-6

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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GRADUATE RESEARCH PROJECT

Presented to the Faculty of the Graduate School of Logistics

And Acquisition Management of the Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Mobility

Jeffrey L. Hupy, BS

Major, USAF

June 1999

Acknowledgments

I wish to express special thanks to my Air Force Institute of Technology Advisor, Major Michael Rehg, Ph.D., whose special encouragement, helpful counsel, and practical suggestions were crucial to the successful outcome of this manuscript. Great appreciation is also due to my Military Advisor, Colonel R. Steven Bunn, of the Aerospace C2 & ISR Center, for his expert advice and assistance in the command and control aspects of the text.

Thanks also to Paige and Claire who constantly offered unique perspectives. Finally, a project of this magnitude could not be completed, if not for the tremendous encouragement and support of the writer's ceaseless inspiration and indispensable critic, Katherine Hupy.

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Abstract

Documents such as Joint Vision 2010 and Air Force 2025 outline military capabilities which the US will need to address National Interests in the near future. Most of these papers espouse decentralized control as a means to improve decision-making speed. As the USAF adds Global Air Traffic Management's required communications equipment to its mobility fleet, they must reconcile the difference between centralized control for efficiency and decentralized control for effectiveness. The existing command and control (C2) organizational structure must be modified to leverage the technological advantages. Rather than blindly invest in facility based equipment, the AF needs a plan based on the total system needs.

A network organization balances the need for decentralized control with the most efficient use of the communications equipment to link the decision makers to the execution assets. Instead of investing in multiple C2 centers, the AF should consolidate its mobility dispatch functions into one location. One consolidated dispatch center provides the benefits of economies of scale and a one stop shop for the warfighter. The consolidated dispatch center does not eliminate the theater mobility planning staff. Rather, it allows the theater mobility experts focus on improving the integration and results of the mobility effort for the CINC without the data entry work of the dispatching center.

COMMAND AND CONTROL OF MOBILITY FORCES:

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I. Introduction

Imagine one plausible military action during the 1999 War in Yugoslavia... Situation update: "As air strikes on Belgrade continue, NATO forces relieved some of the suffering in Kosovo today by air-dropping food to refugees stranded outside Serb held villages." As the formation of two C17s align their aircraft with the intended drop zone, a "sensor" aircraft picks up indications of a surface to air missile (SAM) radar in the area. The Joint Forces Air Component Commander (JFACC) directs the formation to hold outside the SAM's reach while a fourth aircraft shoots a "HARM" (SAM-Killer) missile. After the sensor confirms the threat is eliminated, the C17s air-drop their humanitarian relief, and make the headlines.

As technology improves the US communications capability, this scenario will be controlled via data-link rather than less reliable voice transmissions. The Air Force is adding commercial communication equipment to its mobility aircraft, such as the C17, to meet Global Air Traffic Management (GATM) requirements. This same equipment will enable commanders to communicate directly with the

crews in-flight. Unfortunately, the Air Force is adding the equipment to the aircraft without clarifying which commanders will have the capability and authority to direct these airborne crews. Different aircraft work for different commanders. The JFACC might not have the authority or communications capability to delay these C17s while the others eliminate the SAM threat. The JFACC might need to call a different commander to delay another type of aircraft, such as a C130. Rather than looking at the best way to manage this increased capability, the Air Force is simply adding it to the current mobility command and control (C2) structure.

The C2 philosophy and the vision called for in the Air Force 2025 document are developing in different directions. The C2 philosophy leans toward greater control. The GATM communications equipment enables greater centralized control providing more efficient use of scarce resources and giving commanders around the globe one "shop" to call for air mobility support. Yet, AF 2025 warns that, the military typically uses new technology to further centralize control, but "unfortunately, greater centralized control is the exact opposite of what is desired to maximize the benefits of information technology" (Roman, 1996:v). The vision calls for a decentralized decision process to shorten coordination and reaction times. The military that can react to situations faster than its opponent improves its chances for victory. This 2025 decentralization runs counter to today's ideas of how to manage a limited resource such as air mobility assets. AF 2025 explains that "the information-age military needs the shared information-gathering advantages of a networked organization with the

decentralized decision-making advantages of a flattened hierarchical organization" (Roman, 1996:v). This disconnect needs to be addressed before more money is spent on organizations and equipment the Air Force vision does not include.

Background

In the scenario above, it is clear that the JFACC's tactical control of the C17s is critical. Time spent calling back and forth between commanders to coordinate the C17 actions might prove fatal. However, in other situations the command lines are less clear. In today's mobility structure, different commanders "own" different aircraft and crews based upon a wide range of considerations such as the type of aircraft, the mission particulars, the location of the take-off or landing, and the originating base of the aircraft.

Under the current system, three Air Force Major Commands (MAJCOMS) "own and operate" mobility aircraft. The Air Mobility Command (AMC), US Air Forces Europe (USAFE) and US Pacific Air Forces (PACAF) each manage a Commander in Chief's (CINC's) air mobility assets. AMC is a component under the Unified Command, US Transportation Command (TRANSCOM), and has a global commitment; USAFE works for US European Command (EUCOM) focusing on Europe and most of Africa; while PACAF manages air mobility for US Pacific Command (PACOM) in their area of responsibility (AOR). The CINCs actually own the forces and delegate the management to their respective MAJCOM. Each MAJCOM has a command and control or C2 center

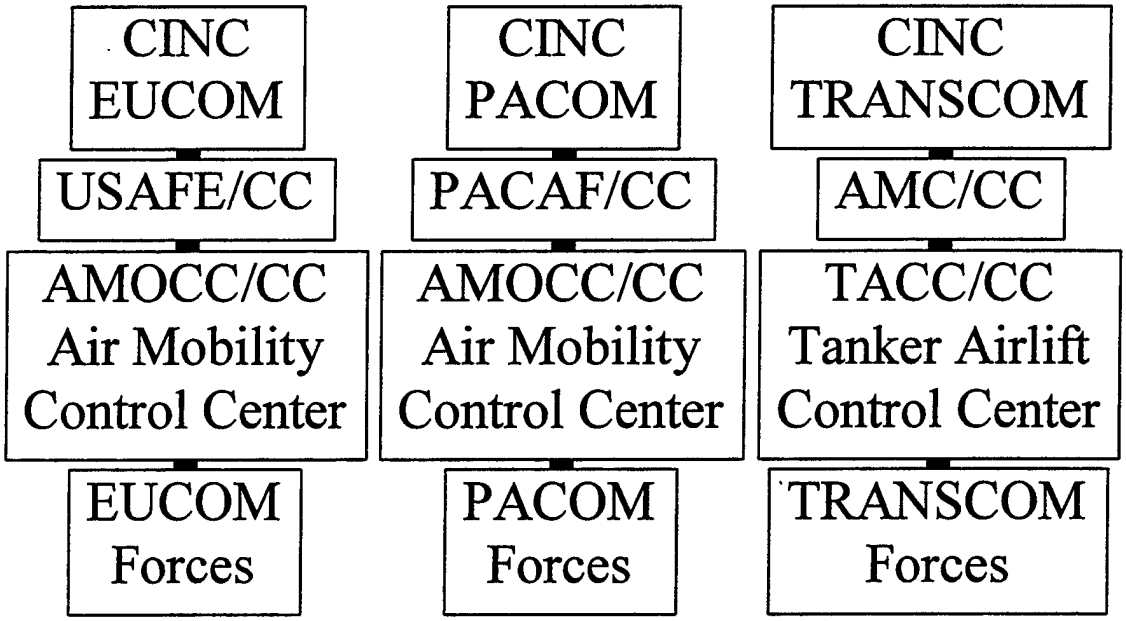

Figure 1. Three CINCs Own & Operate Mobility Forces

(TACC/AMOCC) planning and executing the day to day activities for its assets in its AOR. Figure 1 shows the three CINCs that own and operate air mobility forces, which led to three separate C2 centers. The official link flows from the CINC through the MAJCOM commander to command and control center's commander to the assigned or attached forces.

Since AMC's "global region" overlaps the other two, it is not always clear which center should have control of a given mission to provide the most effective or efficient use of resources. For example, a TRANSCOM mission supporting EUCOM might be managed better by USAFE's center rather than AMC's. The answers as to which center should be in control differ because each mobility center works for a different CINC. CINCs have different missions. Geographic CINCs (such as EUCOM & PACOM), focus on effectiveness for their section of

the globe. Functional CINCs (such as TRANSCOM), work on the efficient use of their assets to support several "war fighting customers" (Kee, 1997:207) around the world. Loyalties to each center's CINC influence their ideas about the best management of air mobility forces. Yet, these parochial viewpoints lead to a fragmented mobility system.

As the Air Force adds the data link communications (GATM equipment), AMC, USAFE, and PACAF centers consult with some of the major US airlines on how best to set up and manage their own dispatch operation. Most major airlines use a dispatch center as a "home office" to schedule, flight plan, and manage the mission details for the flying crews. The three separate mobility centers would perform similar dispatch functions for their specific regions. From an efficient organizational standpoint this duplication is a waste of resources. From a 2025 viewpoint, three (or more, for the other geographic CINCs) centers may be a military necessity to shorten decision times and improve the chances for victory.

Research Question

What is the most advantageous command and control structure for air mobility forces? Should the focus be effectiveness or efficiency? There are three basic options: the current structure of multiple centers, the early 1990's structure of one center, or mix of the two approaches. There are benefits and limitations in each structure. Since the early 1990s, three different CINCs own and operate mobility forces. The strategic and US based forces report to USTRANSCOM through the Tanker Airlift Control Center (TACC). The theater

movements answer to the theater Air Mobility Operations Control Center (AMOCC) or the TACC depending upon which CINC they are supporting with the specific mission. Many people in TACC argue the center could manage all the air mobility missions. Most AMOCC personnel stand on the argument that their existence was mandated by the Chief of Staff of the Air Force to address "the failure of both TACC and the theater to effectively control the air mobility operation" (Gallion, 1999). Rather than supporting a patch-worked solution, the Air Force needs to look at the best C2 solution to answer the overall system needs. Can one command and control organization effectively manage mobility assets around the globe instead? How can people based in the US make educated decisions about local intricacies in other countries? Which organization is the best to have direction authority for "strategic missions" supporting "theater requirements?" Should there be some sort of hierarchy between the theater and global command and control? Should the Air Force pay the manpower and equipment bills for three separate C2 centers? If two geographic CINCs require AMOCCs to manage theater air mobility, should the other three (Atlantic Command, Central Command, and Southern Command) establish AMOCCs as well? Do these options fit with the Air Force's 2025 vision or the Air Force's concept of Dynamic Aerospace Command?. With the growing emphasis on cooperation and integration to reduce waste without reducing capabilities, it is time to establish an integrated mobility command and control system. Bending the current C2 structure toward an AF 2025 vision will provide these efficiencies and improve the mission effectiveness.

Scope of this Project

This paper deals with the organization of the Air Force command and control of mobility forces for the warfighting CINCs. In doing so, the project outlines C2 as the elements of direction necessary for the CINC or JTF Commander to execute a mission or operation. The organizational structure should support this function of necessity. The paper does not address the technological details, but rather some near term capabilities, which should be incorporated into the planning and development of the C2 structure. As one historian explains, command and control discussions concentrating on technology may cause one "to lose sight of what command is all about" (Van Creveld, 1985:275). Although the focus is directed to the mobility missions and forces, there may be lessons for the managers of other aircraft and crews because the basic functions and issues are similar.

The paper also stops short of addressing the discrepancy between the overseas Air Force MAJCOMs. Some MAJCOMs "own," while others "borrow" mobility forces. The US has changed its military posture from a train and fight in place or "forward based" approach to a train in the US and deploy to fight or "forward presence" concept. With this change, many overseas locations have relatively few permanent personnel and operate with a majority of temporarily assigned forces. Air Force components in Central Command (CENTAF) and Southern Command (SOUTHAF) no longer have permanently assigned air force assets. The political aspects of the North Atlantic Treaty Organization for USAFE

and the Korean cease-fire for PACAF have kept air force assets permanently assigned in USAFE and PACAF. This discrepancy is outside the realm of this paper.

One of the many important reasons for looking at an organization's structure relative to its function is promoting the efficient and effective use of resources. As US military leaders seek to prepare the DoD for the next century, they work towards ideas published in Joint Vision 2010 and other forward thinking documents. CJCSI 3010.02 explains that one of the strategies for implementing a Joint Vision relies on leadership's ability to "explore revolutionary ideas through an evolutionary process to achieve the right capability" (Department of Defense, 1998:3). For C2, people are looking at integrating information to support the "Warfighter." Efforts to link information from satellites

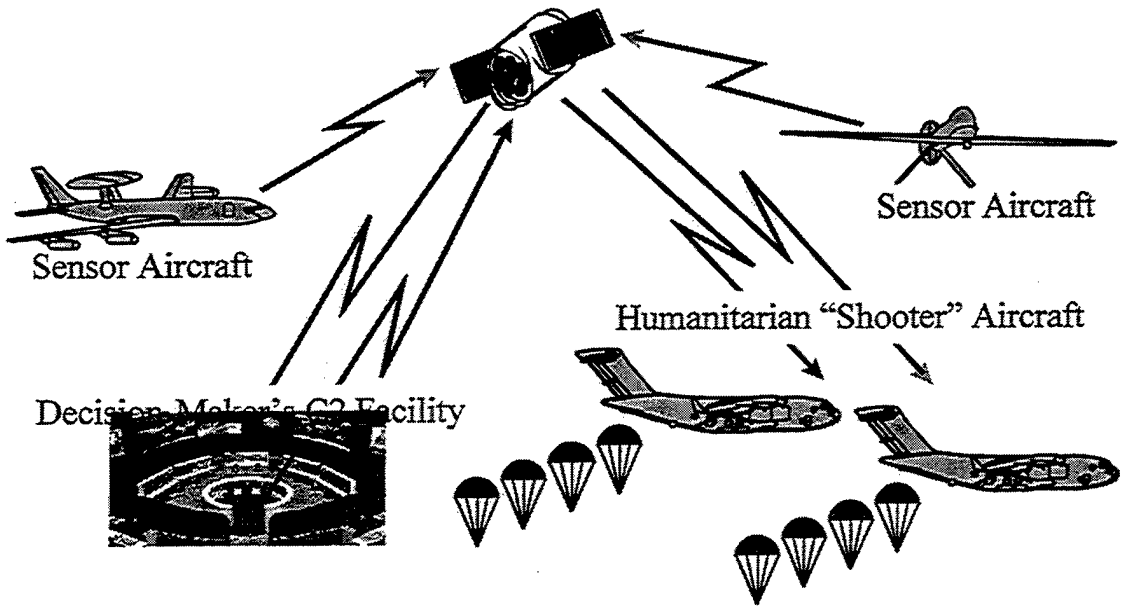

Figure 2, "Sensor to Shooter" Information Link (Department of Defense, 1996:20)

and other "sensors" through decision makers to other aircraft and "shooters" have the potential to integrate crisis actions as never before. Figure 2 depicts the data link information flowing from the "sensor" aircraft to the decision-maker and to the "shooter" C17s. The decision-maker adds information and directs the C17s to air drop their humanitarian relief supplies. In addition to linking combat power and delivery, military leaders look to technology for improving strategic and theater logistic support to the warfighter. Ventures to incorporate current commercial technology into the mobility command and control systems promise near real time information and synchronization of people and equipment getting to and from the crisis or fight.

Unfortunately, the current mobility efforts are adding technology for improvements without looking at the organizational structure. This creates incremental changes without reaching the full potential benefits of the new technology. Just as many people underestimated the power of the personal computer as a "glorified typewriter," the Air Force is in danger of limiting the benefits of technology by strapping it on to the current C2 structure. There is a strong potential that the Air Force is investing millions of dollars to speed up their command and control typewriter. "The corrosive effect of an outdated command and control orientation prevents the American military, particularly the Air Force, from fully applying the benefits of information technology" (Roman, 1996:3). Before investing further in the technological changes, the Air Force needs to look at the coming mobility requirements and choose an organizational structure to

support those circumstances. The structure must fit the function and enable the faster, more accurate decisions required for future success.

Overview of Subsequent Chapters

Chapter 2 provides some relevant information and definitions to provide a common framework for the discussion. Chapters 3, 4 and 5 work through the pros and cons of the different C2 options. Finally, Chapter 6 includes recommendations and conclusions.

II. A Common Frame Of Reference

Many of today's military leaders give a practiced "knowing nod" or an all knowing "wave of the hand" to cover discussions of command and control. Yet, many of the same people fail to use consistent terminology, which leads to poor understanding of the command relationships among the subordinates. During a 1999 briefing in USAFE, a Colonel explained that TRANSCOM "CHOPPED" C17s to the theater and the C17s would be under theater TACON for the relief effort in Kosovo. People question a leader's credibility when the use a change of Operational Control (CHOPPED) and Tactical Control (TACON) interchangeably. Most people in the room knew what the Colonel meant, but remarks such as these and the "wave of the hand" create confusion for those being lead. Confusion as to which leader is the decision-maker not only creates duplication of effort, but also leads to dangerous situations. Few people pay attention to the C2 discussions until the accident. The search for the person in charge often eclipses the tragic event as it did in the 1994 Black Hawk shoot down or the 1996 crash of Secretary Ron Brown. This section reviews some of the information critical to command and control that many in the military think they know.

One of the most crucial elements of any organization is its C2 structure. This element outlines whom the decision-maker is as well as how the decisions will be made known to the organization. The Joint Chiefs of Staff define command and control as:

> The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission (Department of Defense, 1999:87).

This definition is a bit unwieldy, but it raises two important points. First, higher levels of leadership designate the decision-maker and the people to accomplish the mission. Second, communicating informed decisions or information flow is hindered or helped by the organizational structure.

Command Relationships

The relationship between the properly designated commander and the assigned or attached forces is an important issue when people discuss command and control. Figure 3 shows the interdependence of these command relationships for the European Theater, but do not rely on the quick graphic. Numerous attempts to paraphrase these relationships without source information contribute to the confusion. The Joint Pubs have the following definitions for the command relationships:

> Combatant Command (Command Authority) (COCOM) is the command authority over assigned forces vested only in the commanders of combatant commands by title 10, US Code, section 164, or as directed by the President in the Unified Command Plan (UCP), and cannot be delegated or transferred. COCOM is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations,

> joint training (or in the case of USSOCOM, training of assigned forces), and logistics necessary to accomplish the missions assigned to the command. (Department of Defense, 1995: xi)

COCOM key points are: Title 10 or the President; not transferable; and direction over all aspects of military operation. COCOM is akin to ownership.

> Operational Control (OPCON) is inherent in COCOM and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. OPCON is command authority that may be exercised by commanders at any echelon at or below the level of combatant command and is transferable. (Department of Defense, 1995:xii)

OPCON key points are transferable (forces are CHOPPED when OPCON is transferred to another commander) and authoritative direction to accomplish missions. OPCON is an indefinite loan.

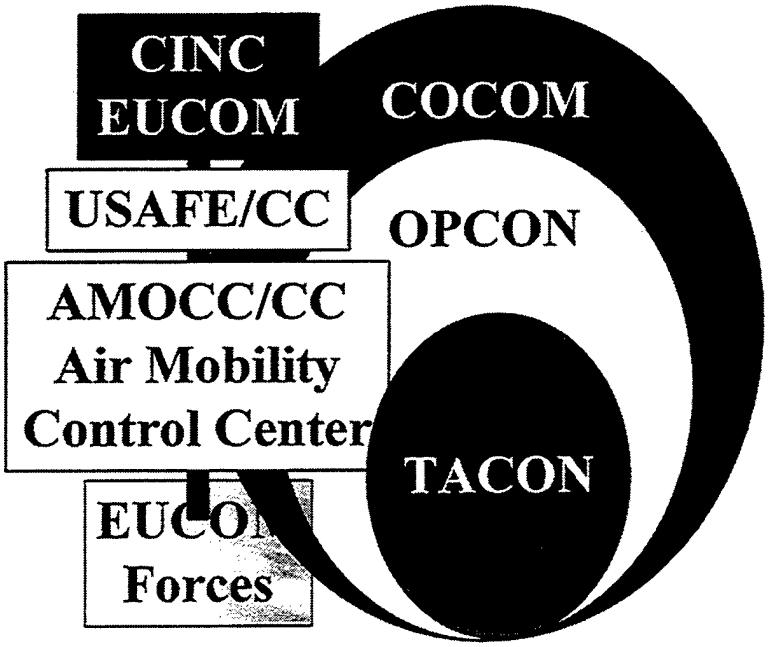

Figure 3. Command Relationships

> Tactical Control (TACON) is the command authority over assigned or attached forces or commands or military capability made available for tasking that is limited to the detailed and usually local direction and control of movements or maneuvers necessary to accomplish assigned missions or tasks. TACON may be delegated to and exercised by commanders at any echelon at or below the level of combatant command. TACON is inherent in OPCON (Department of Defense, 1995:xii).

TACON key points are: delegated authority to accomplish specific missions or tasks; limited; and detailed. TACON is a finite loan.

Overview of Organizational Structures

Just as the Joint definitions relating to command and control seems cumbersome, so can organizational structures. Even before the Air Force became its own service, the question of who is in charge was a problematic issue. General George C. Kenney went to Townsville, Australia in 1942. His new unit was a conglomeration "with so many lines of responsibility, control, and coordination on the organizational chart that it resembled a can of worms" (Barry, 1998:31). Today's structures are often called "wiring diagrams" because they resemble the complex graphics depicting an aircraft's electrical system. Discussing the organizational issues requires some understanding of different structures.

Five basic descriptions of organizational structures help people understand how the individuals in an organization interact and the information flows. Hierarchical versus flat organization refers to the number of levels information must traverse to reach the decision-maker. The more hierarchical an

organization is, the more layers of communication involved. Functional, product, and matrix orientations describe the division of information and labor. Functional organizations divide the work into areas of expertise, while product orientations use teams of individuals to work one project. A matrix organization mixes functional perspectives into product orientations. Each arrangement has benefits and drawbacks.

The military typically uses its hierarchical organization to make the force an extension of the commander by funneling issues to the commander for a decision, as in Figure 4. This allows the commander to manage several diverse areas and complex situations because experts at each level extract superfluous data from the information and add their recommendations. The benefit is the decisions come from the leader responsible for the success of the mission.

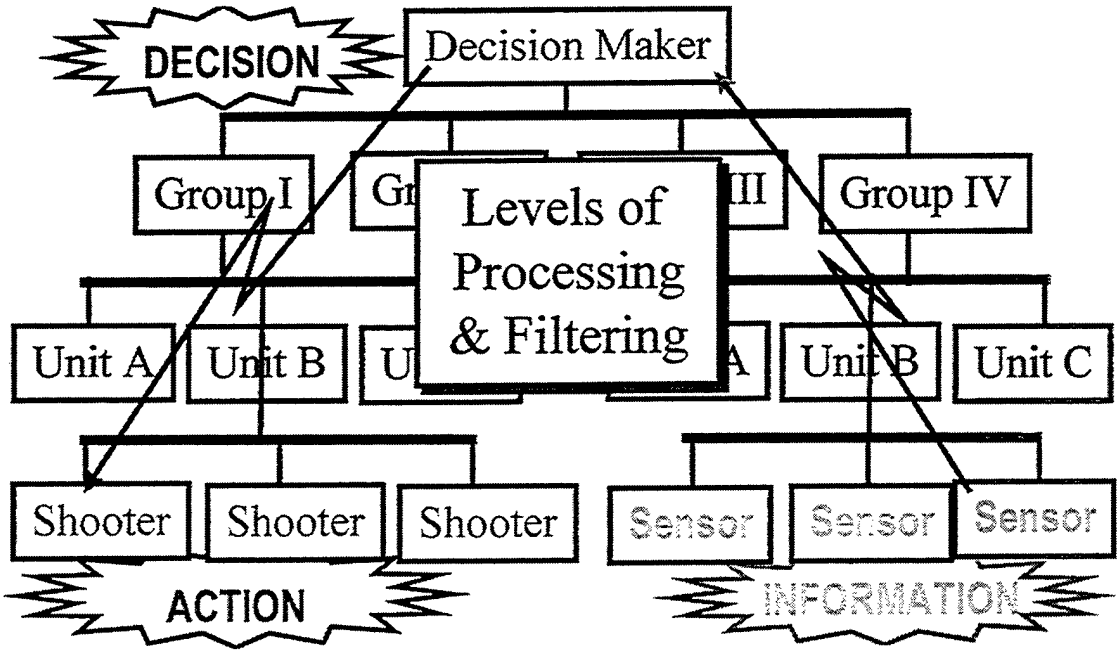

Figure 4. An Example of a Hierarchical Organization

Presumably, this person has the knowledge and experience to make the best decision. The drawback is that each layer of the organization processes the information. Two problems arise from this limitation. The processing takes time and levels alter the information based on their (middle managers') parochial judgement (Roman, 1996:21). Verbally passing a telephone message from an office worker through an executive officer to the commander illustrates both limitations.

A flat organization eliminates the middle managers and enables the decision-maker to control situations based on unaltered information and in less time. This works well for smaller organizations with limited diversity in specific functions, as shown in Figure 5. The problem comes from the wide range of activities most military leaders must supervise. Excessive information can overwhelm the decision-maker and stall the process (Scott, 1992:256). The

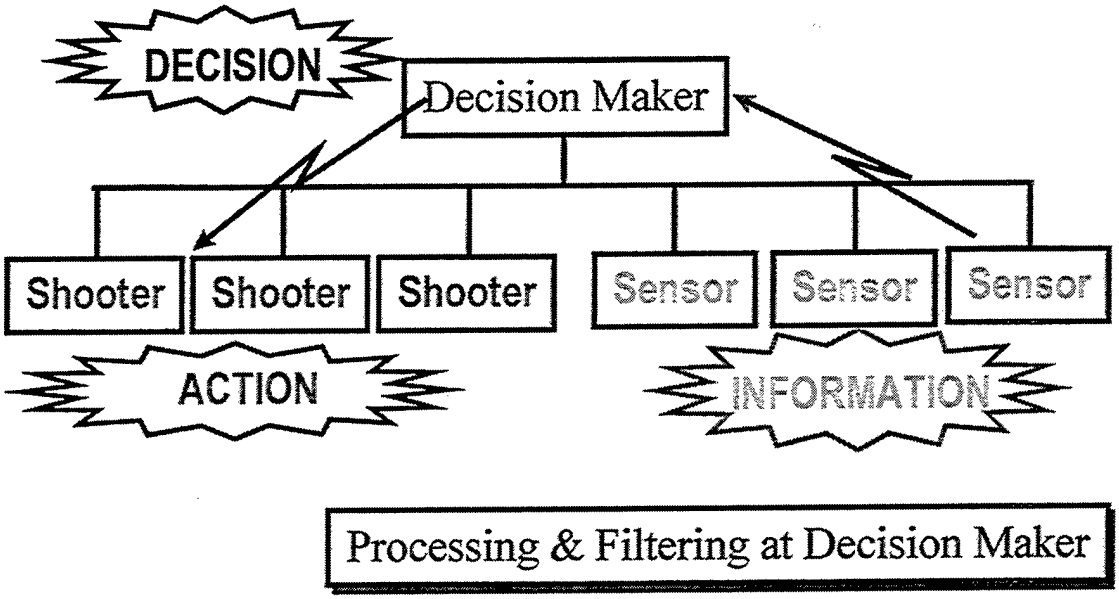

Figure 5. An Example of a Flat Organization

volumes of information available today and the span of control required to handle a crisis often dictate a more complex organization.

A networked organization links several flatter organizations without adding layers as in the hierarchical structure. This linkage enables the commander to control the direction of the organization without controlling each decision. Information is shared throughout the network rather than funneled up through several layers. The shared information allows autonomous operation at all locations based on the overall commander's vision and the networked data. Figure 6 shows a close up of one of the nodes in a sample network. This type of organization allows a faster decision cycle and decisions based on high level direction married with information on local conditions (Roman, 1996:22). Because the information is shared across the network, informed decisions are made at the nodes rather than waiting for pooled information to be processed at

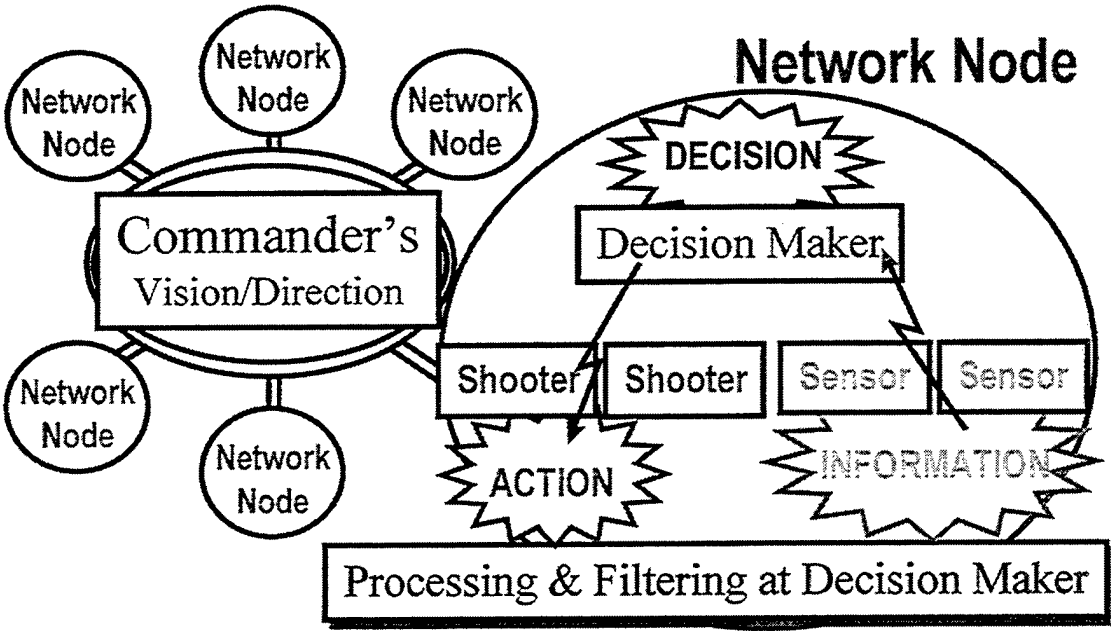

Figure 6. A Network Organization with Decision Nodes

the commander's level. Much like the distinction of "Instant Thunder" as the quick, decisive, and overwhelming air campaign compared to "Rolling Thunder's gradualist approach" (Department of the Air Force, 1999:16) a network organization allows simultaneous decisions supporting the CINC's plan rather than the sequential process of today's hierarchical structure. The drawback is less direct control for the commander.

Both hierarchical and network organizations can be functional, product, or matrix designs. The biggest advantage of a functional arrangement is maintaining technical expertise within a functional area, which strengthens their knowledge base and affords vertical advancement within the specialty. The disadvantages are aspects of the project not directly related to the functional area can become neglected and communication flow is limited across functional boundaries. Product organizations focus all efforts on the end result and shorten the lines of communication. The drawback is a duplication of resources because resources are not shared across projects. A matrix organization attempts to blend the best of functional and product orientations by using functional experts on different projects. The project manager focuses the team toward the project, but the functional manager determines which experts and which technologies best suit the project. The benefits are better communication while maintaining the home of functional expertise. The problem is workers have two bosses – the project manager and their functional manager (Chase, Aquilano, and Jacobs, 1998:53-54).

A Product Structure in the Military: The JTF. When a crisis, such as the 1999 War in Yugoslavia, arises in a CINC's AOR, they normally create a temporary "product oriented" organization to manage the effort. This organization or Joint Task force draws experts into one location to focus on a specific problem or crisis for the CINC. The JTF commander is designated JTF/CC or JFC. The JFC sets up the organizational structure according to the task at hand. As Joint Publication 3-56.1 explains,

> The organization the JFC develops should be sufficiently flexible to meet the planned phases of the contemplated operations and any development that may necessitate a change in the plan. **Unity of effort** is necessary for effectiveness and efficiency. **Centralized planning** is essential for controlling and coordinating the efforts of all available forces. **Decentralized execution** is essential to generate the tempo of operations required and to cope with the uncertainty, disorder, and fluidity of combat. (Department of Defense, 1994:vi)

It is interesting that the text includes Unity of effort and centralized planning in the description. The Joint Publication seems to point to the JFC, or a level below the CINC for centralized planning of all available forces. This concept of operating does not appear to address the mobility forces, which may be part of the JTF effort one day, and supporting another CINC the next day. The mobility requirements must be included in the JTF planning for maximum effectiveness, but it also needs to be centrally planned at a level above the JTF to incorporate CINC TRANSCOM's global responsibilities.

The C17s in the relief airdrop scenario fly in support of the JTF's humanitarian mission. The following day, these same aircraft and crew might carry cargo to the Middle East for CENTCOM. The appropriate level for their

centralized plan is not clear in the Joint definition. This shortfall leads to a complex bleed air chart for the JTF (Figure 7). The TRANSCOM C17s are managed by the Air Mobility Element (AME) working as an extension of TACC in the JTF structure.

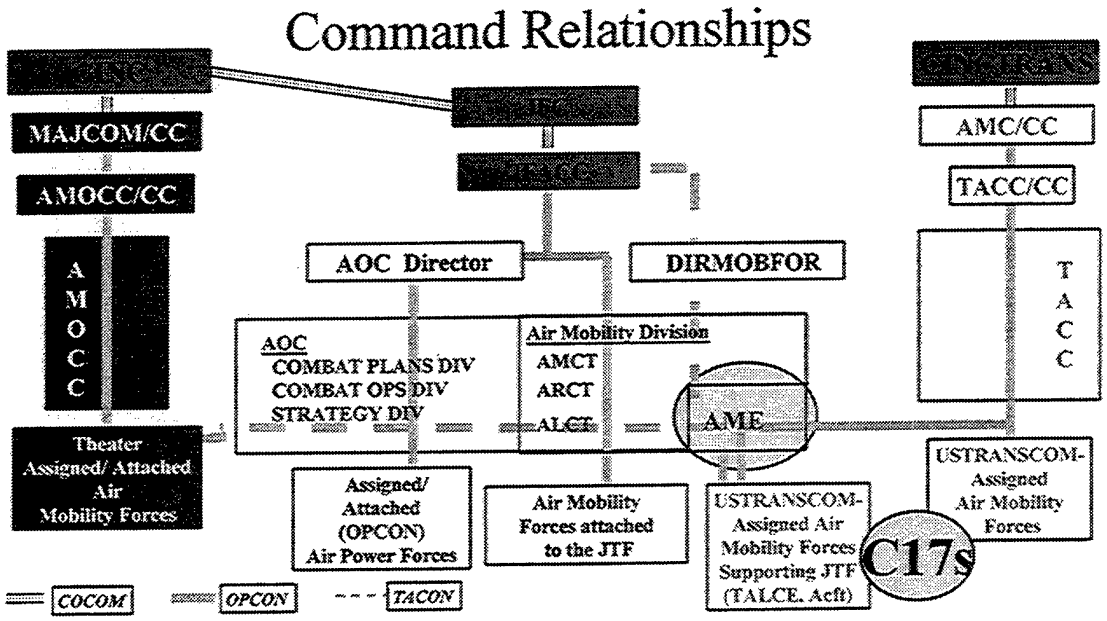

Figure 7. Example "Wire Diagram." of the JTF's Command Relationships (Department of the Air Force, 1998:59)

Part of the organization the JFC creates is the Air Operations Center (AOC, in Figure 7). This group plans and executes the air campaign for the Joint Forces Air Component Commander (JFACC) mentioned in the initial scenario. Recent reviews of the AOC organization envision a smaller number of people located near "the fight" with another section of the AOC "in-garrison" at their home station. Improved communication capabilities allow the forward team to "reach back" to the in-garrison AOC for support. The forward group coordinates

with the other JTF planning and execution personnel and the rear area team works the data entry, and specific details. The concept is called split or distributed operations. The phrase split operations refers to different geographic locations under the same commander. Distributed operations describe independent nodes in a networked organization working toward the same objectives (Dodgen, 1999).

Organizing Air Mobility. Since 1942 the trend has been to "organize air mobility forces to meet the situation, centralizing control as much as possible to avoid duplication of effort" (Kee 1997:219), rather than decentralizing control for a faster decision process. It is possible to create a networked system, which speeds the decision process and avoids the duplication of effort. "Networks seem able to achieve both efficiency and flexibility" (Mintzberg and Quinn, 1996:351). The addition of air mobility forces' communication equipment does not automatically solve the current fragmented organizational structure nor address the issue of whether a hierarchical or a networked organization would improve the C2 system.

The main roadblocks to an improved network system come from the different leadership focuses. Each CINC is charged with a specific mission and provided forces to complete that mission. Any forces the CINC loans or allows another CINC to manage may not be readily available when a problem arises. Therefore, most CINCs are reluctant to risk failure in their mission by giving away

forces or allowing these forces to be controlled by another. This is where the formal system ends and the informal one begins.

The risks of being caught with forces outside the CINC's immediate reach create personality dependent situations and can lead to mistrust and communications problems. One case in point is related by Colonel Gallion's war story about C17s at Ramstein for Joint Guard. With a C17 on the ramp and validated C17 cargo in the port, Colonel Gallion could not task the mission to carry the cargo, even if the aircraft had no other mission because the aircraft was not under USAFE's control. The mission's coordination effort had to go as a request up through USAFE to EUCOM then over to TRANSCOM to be assigned to AMC and TACC to schedule. "In a truly seamless C2 environment, a simple phone call would be all it takes to do this" (Gallion, 1999).

Instead of patching the formal system with personalities, the MAF should use the new communications equipment as impetus to improve the organizational structure. Only by looking at the structure and the technology will the mobility C2 yield the "revolutionary ideas through an evolutionary process to achieve the right capability" (Department of Defense, 1998:3). For most of its existence, the Air Force has said, "Doctrine-Smoctrine! Hire the right people and they'll get the job done" (DIRMOBFOR, 1999). Now is the time to give those right people the advantage of a strong organization tailored to the task instead of throwing additional bodies at the problem to fill the gap.

III. The Current System: Three Centers, Three Convictions

The current air mobility command and control structure stems from shortfalls of the previous system. Following the Air Force's reorganization in the early 1990s, PACAF and USAFE had mobility aircraft and crews under their command without their own mobility command and control organization. The commanders decided they needed a capability similar to AMC's recently established Tanker Airlift Control Center (TACC). PACAF and USAFE created Air Mobility Control Centers or AMOCC's to answer the CINCs' directions. The three units are functionally organized within a rigid hierarchical structure. Official coordination must travel up through each chain to the CINC, over and back down the other chain. Still, as these organizations have matured over the past few years their capabilities and expertise have grown. Adding data link communications equipment to these centers seems logical as long as PACAF and USAFE continue to have forces.

Atlantic Command, Southern Command AND Central Command manage theater mobility issues with their associated MAJCOM's staff up to a point with the aid of one of the three existing centers. If the theater establishes a Joint Task force, an Air Mobility Division (AMD) as part of a JTF organization manages the air mobility missions. Since these Commands do not have mobility forces permanently assigned, they function without AMOCCs. In a sense, they contract out to other Air Force units to control their air mobility missions. This could be a

model for PACOM and EUCOM when the political realities allow their forces to be based in the US.

Advantages of the Current System

The AMOCCs have been effective in several areas of coordination and procedural changes to improve air mobility missions, especially in Europe. Personnel stationed in the same areas as the agencies developing requirements, such as Euro-Control, can often provide better solutions than those dealing through telephone calls and videoconferences. The initial USAFE AMOCC commander explains, "The AMOCC is not duplicating capabilities, but adding multiplicative abilities for the MAF [Mobility Air Forces]" (Gallion, 1999).

With such an improvement in capabilities, adding the new communications equipment is a logical step. Not only does the equipment improve the immediate command and control functions for the three centers, but it also improves the data reliability and integrity for the "owning" CINC. Having the same equipment allows any center to communicate with any equipped aircraft. The TACC and the AMOCCs might provide C2 functions for the other services mobility aircraft assigned to their CINCs. The addition also meets the CINCs' directions to have a mobility command and control capability, as well as maintains air mobility expertise in the theater's chain of command. With mobility experts in the CINC's chain of command, TACON and OPCON transfers of authority are more palatable for mobility force commanders. The three centers option also avoids

the problem of changing force structures and manpower positions because things could continue as they are today.

Disadvantages of the Current System

The biggest drawback to this approach is it reinforces the current parochial viewpoints versus a Joint Vision 2010 organization. The JV2010 Implementation Plan calls for leaders to "Transform the current force to realize the full potential and promise of the Information Revolution and Revolution in Military Affairs" (Department of Defense, 1998:3). The current three centers have no overarching direction or single point of leadership. Each center functions as an extension of its respective CINC. There is no requirement that the centers cooperate or coordinate other than a corps of mobility leaders promoting a better working relationship. This relationship is very personality dependent and no one office has the authority to promote a common approach or direction for future efforts.

Three separate centers also pose a problem for aircrews and controllers. For example, a C5 crew flies on a mission to the Middle East. As the C5 crosses the Mediterranean towards Bahrain, their communications gear displayed a message diverting them into Italy for an emergency. The message has a verification code, so the crew knows it is legitimate. The dilemma is they are not sure which center has OPCON. The crew is normally under TRANSCOM (TACC), but they are in the EUCOM AOR (AMOCC) and they are carrying cargo for CENTCOM. The problem should be easy to solve by a few data linked

messages to the two centers to find out the actual status, but it does not follow the Joint Publication guidance. "The primary emphasis in command relationships should be to keep the chain of command short and simple so that it is clear who is in charge of what" (Department of Defense, 1995:III-9).

Another drawback to operating three centers is the cost of manpower. In a time when the Air Force is admittedly short of pilots and other specialties, three centers take more personnel than one. Combining the centers allows supporting activities such as public affairs, facilities management, and finance to gain efficiencies from "economies of scale." While it may take one person to provide publics affairs for a unit of 100, it may only take two people to provide the same support for a unit of 400. Air Mobility should lead the way by reducing the excessive overhead of multiple independent C2 centers. This structure furnishes effective air mobility at the expense of efficient, personality independent operation.

JFACC Scenario with Three Control Centers

In our Yugoslavia scenario, as the JFACC directs the AOC/AMD to hold the C17s, the TACON issue would have to be worked out prior to the mission. The JFACC does not always have TACON. Currently it is undecided whether or not the JFACC's organization would have the GATM communication systems. Until then, the AMD would call to the appropriate command center (based on the aircraft's owner) and that center would enter the data link message. Figure 8 shows the phone path for TRANSCOM C17s versus EUCOM C130s. If each

center and the JTF all have the communication systems, the crews must know which agency is in charge of their mission, where and when. Consequences of misunderstanding which agency had control could be fatal.

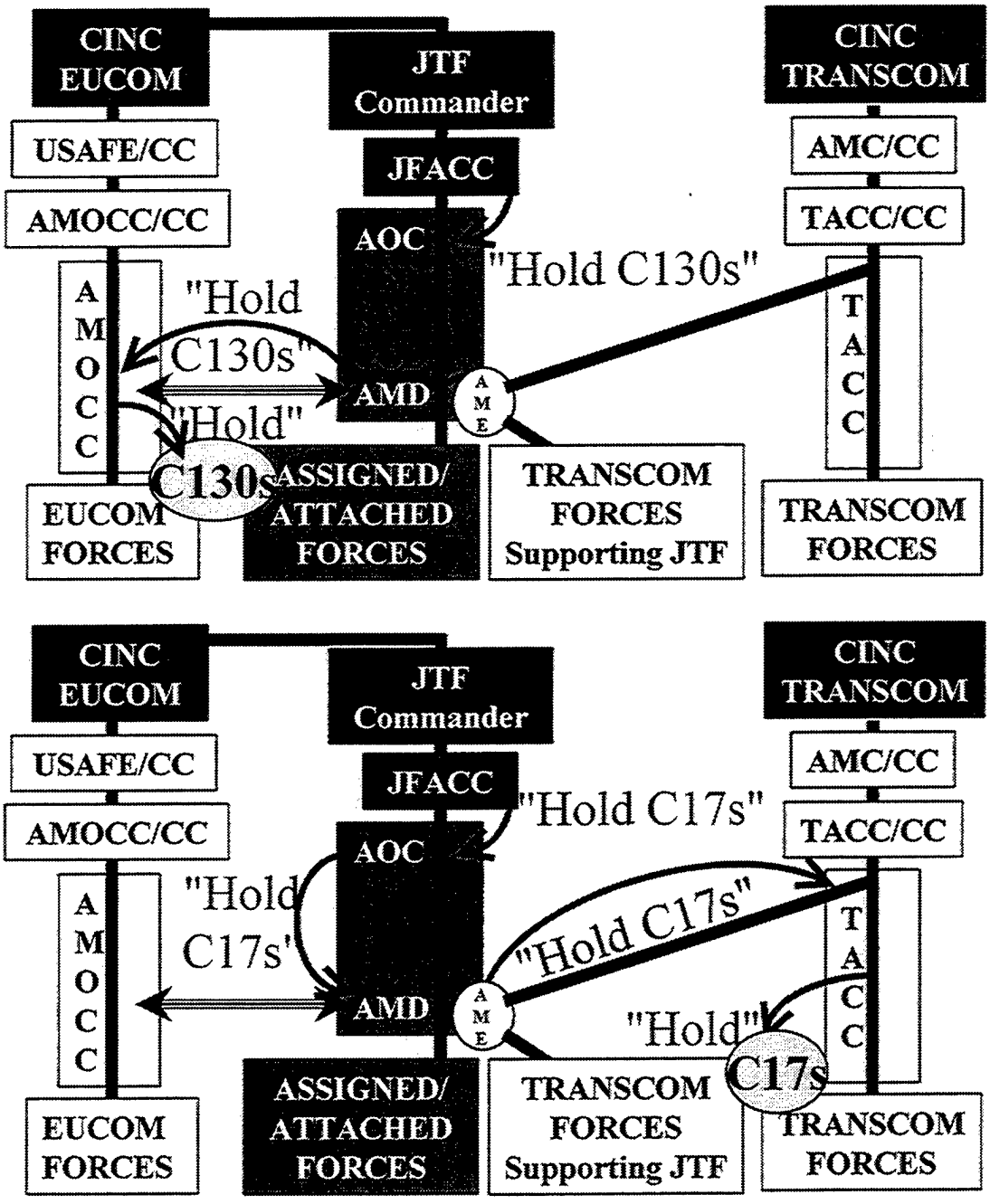

Figure 8. JFACC's "Hold" Message through the Appropriate Control Center

IV. A Single Control Center: A Single Approach

In much the same way as many commercial companies manage dispersed resources, air mobility could be managed from a single location. This method pools functional experts into one location to create a one-stop shop for internal and external customers. For commercial airlines, all flights are dispatched (managed) from one operations center. The dispatchers create and file flight plans, work maintenance and loading issues, as well as re-file weather diverts while the crews are in-flight (Wells, 1994:242). As each of the three mobility centers consult with commercial airlines about how best to develop this capability, it would be more cost efficient to put all the investment into one location.

Advantages of a Single Control Center

One center managing all the mobility assets for all the geographic CINCs and TRANSCOM would not only provide one-stop-shopping for the DoD air mobility customers, but it would also provide one-stop-shopping for the crews and mission support forces. Consolidating all the management resources into a single location enables the leadership to optimize the limited air mobility resources by taking a global view and moving assets to support several different locations, rather than limiting them to one specific area. "The process and organization of mobility should be a[s] simplified as possible..." (Kee 1997:222).

One center, deploying people for an Air Mobility Division (AMD) to support the JFACC's Air Operations Center is simple. The forward group in the AMD is intimately familiar with the people and processes of the consolidated center. Lines of command and control are well understood because people work the same processes daily.

The cost of one larger center is less than the cost of three smaller ones. All US major airlines have a centralized hub to consolidate their worldwide operations through a data linked operations center. In spite of the investment costs, these airlines plan to continue adding GATM capability to their total fleet. According to one airlines operations center representative, the maintenance data link alone justifies the cost of the GATM communication equipment (Aircraft Communications Addressing and Reporting System - ACARS). Finally, these centers save more than an estimated $200 Million per year (TACC, 1999). With this information, efficiencies of one data linked C2 location are clear.

Disadvantages of a Single Control Center

Mobility experts in PACAF and USAFE will argue that the theater CINCs lose mobility expertise without the AMOCCs located next to the Commander in Chief's staff. Not only do mobility forces lose a valuable proponent for their capabilities, but they also lose opportunities to move up in the theater CINC's chain of command. This lack of mobility expertise also promotes distrust of the leadership in the single location. The decisions made from a global perspective may seem less than supportive or even arbitrary to the theater perspective

without a mobility voice to help clarify issues. Colonel Gallion's experience coordinating the C17 support in Operation Joint Guard is a prime example. Without his knowledge of TRANSCOM and AMC procedures, USAFE would not have known to call TACC with a "heads up" of the official request coming through EUCOM and facilitate the eventual approval by TRANSCOM (Gallion, 1999).

Mobility experts in the theaters also explain that a single center cannot manage regional intricacies and integrate new ideas as well as separate centers. "AMC can provide strategic expertise, but knows little to nothing about the local operating environment" (Millander, 1997:14). USAFE AMOCC's successes with EURO-Control demonstrate the benefits of having a local office. Coordination and numerous discussions led to an automated process for crews departing AMOCC controlled bases. Through its electronic link, the AMOCC files flight plans prior to the crew's arrival to meet Euro-Control requirements without impacting the crew duty day. Testing such an idea takes more time and coordination in a larger, consolidated center. Because of the loss of valuable proponents and expertise required to manage regional differences, one single center can not work the way it does for civil air operations. This structure provides efficiency as the expense of effectiveness.

JFACC Scenario with a Single Control Center

For our Yugoslavia scenario, the single control center would deploy people to work in the AMD as soon as the crisis began. The JFACC's direction would be through the Air Operations Center to the Air Mobility Division. The

AMD would call to the C2 center and the dispatcher would send the message to the C17s. OPCON and TACON issues would be less of a concern because the AMD would be working through one center and crews would always receive

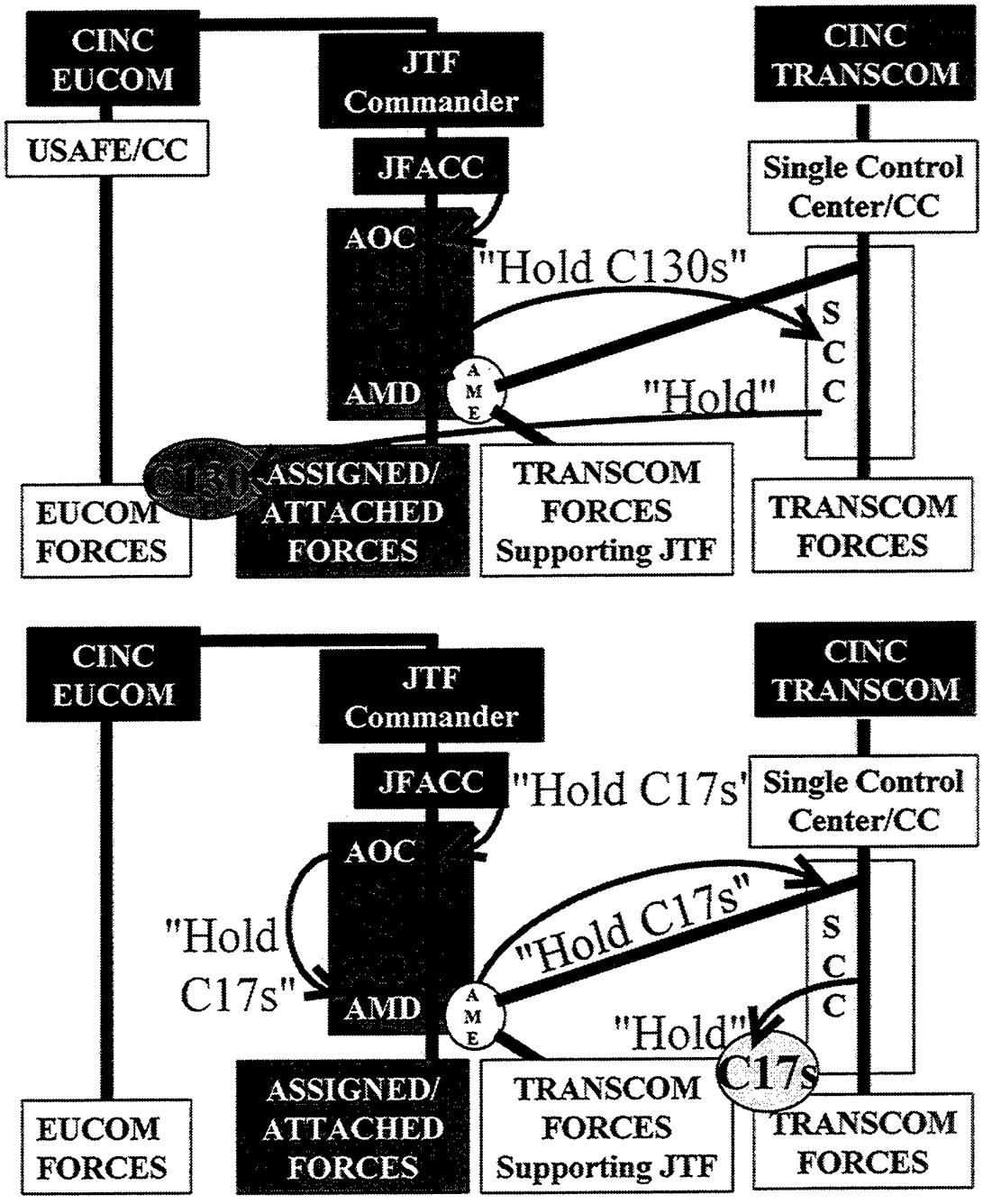

Figure 9. JFACC's "Hold" Message through a Single Control Center

information from the same source. Figure 9 shows the missing link for the theater CINC over the assigned forces that led to the initiation of the AMOCCs.

V. Distributed/Split Operations: Distributed Planning, Networked Through a Centralized Dispatch Center

The inefficiencies of three centers and the loss capabilities of one center can be eliminated in a networked organization. The Air Force should create a network to manage air mobility through distributed or split operations. Distributed and split operations both deal with geographically separated organizations. With split operations, the total organization is under one boss. Distributed operations are more formalized process between different groups under different bosses. Both focus on a small forward team to reduce support requirements and a larger, more robust team based "in-garrison" with more permanent facilities and support. "The bulk of the planners and controllers at home station... receive inputs from the [CINC] JTF leadership, plan, integrate, and feed to a consolidation cell to task and control the effort, all using distant communications technology" (Kee, 1997:214). It does not matter if the communication is between the AOC/AMD and a theater control center or a consolidated dispatch center. The C2 organization becomes a network of "light, lean, and lethal" forward cells connected to a robust consolidated center.

Distributed operations enable all the theaters to incorporate mobility experts into their staffs without paying a manning price for a full AMOCC. The consolidated dispatch operation takes care of the data entry and mission management. In a sense, the theater staff "contracts out" for the dispatch

functions and keeps the mobility planners and local experts to work issues with the host nations.

Advantages of a Consolidated Dispatch Center

Two big benefits come from a consolidated dispatch center: efficiency and effectiveness. Efficiency stems from economies of scale. For example, if every 10 aircraft require 1 facility based communications link and both AMOCCs are running 10 to 15 missions, then they both need two sets of the equipment. Bringing the two centers into the same location reduces the number of communication links from four (two in each center) to three. Two centers with 15 missions equal 30 missions, which one center can manage with only three communications links. The same principle applies to the personnel positions as well.

The effectiveness comes from the theater liaisons. Keeping mobility planners and local experts "in-theater" strengthens the mobility knowledge base for the warfighter. Eliminating the data entry tasks enables these experts to focus on solving theater and mobility unique issues. Some of the major commercial airlines incorporate a similar structure with front offices in large international cities to work local coordination issues while the dispatch centers work the actual flight schedules.

The enabler is TACON. Remember the previous section on command relationships and a CINC's reluctance to transfer control of their forces to another. Transferring TACON enables the theaters to maintain control of the

forces without getting caught up in the minute by minute details. The theater commander can direct the intent of the mission and TACON the aircraft and crew

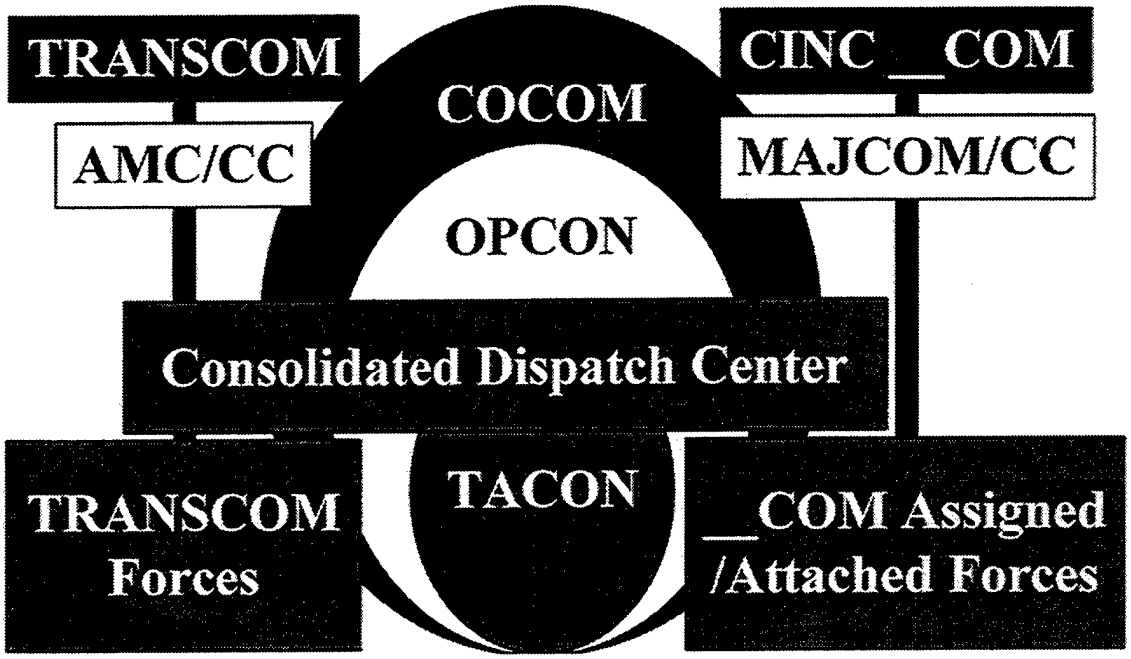

Figure 10. Consolidated Dispatch Relationship for Mission Management

to the consolidated dispatch center for execution. Crews have a one-stop-shop for mission issues. In Figure 10, the forces assigned or attached to ___COM (fill in the blank) remain under the MAJCOM's Operational Control. Theaters have an easier time coordinating for assets outside their operational control because the "owner never gives up OPCON of the assets. CINC ___COM retains control of the forces and tomorrow's ability to respond to another crisis. The consolidated dispatchers plan the missions based on the local mobility experts guidance to execute the CINC's or JFACC's vision for the crisis or fight.

For example, theater planners might better solve an African humanitarian contingency involving primarily deployments from Europe and CONUS (Kee,

1997:213). They work the overall guidance, translating the JTF vision into the mobility effort. Instead of other units deploying personnel to round out the AMD or increase the data entry capability of the AMOCC, people in the consolidated dispatch center manage these functions remaining "in-garrison." The theater experts deploy forward with the JFACC and the AOC, taking enough communications and planning support to relay requests and requirements back

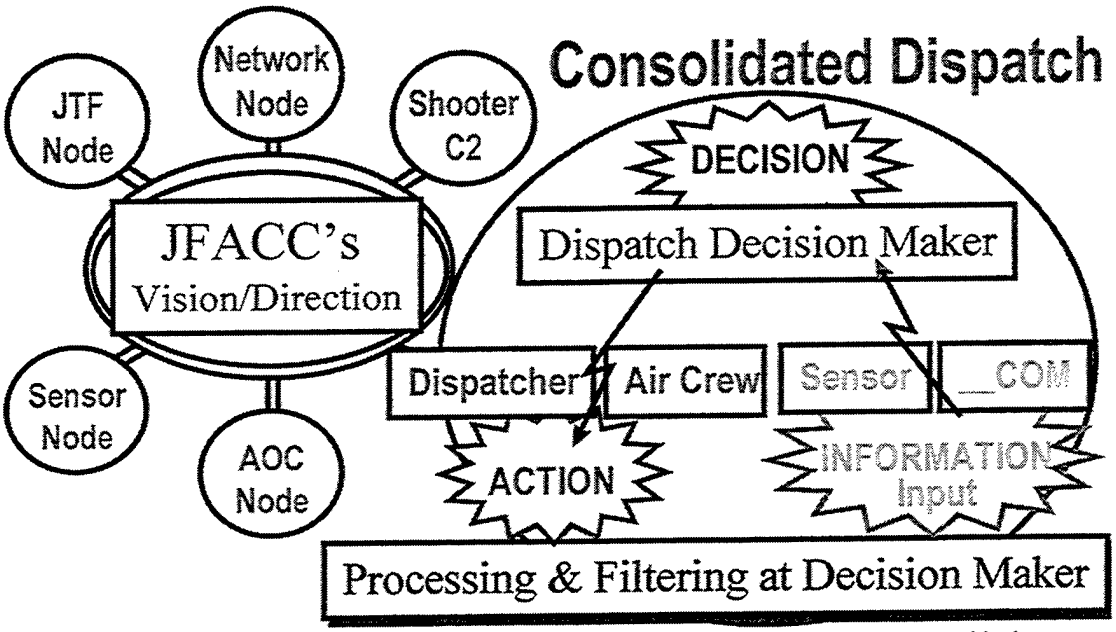

Figure 11. JFACC's Network includes a Consolidated Dispatch Network as a Node

to the consolidated dispatch center. Figure 11 shows how the JFACC's network, on the left, includes the Consolidated Dispatch Center as a node, on the right, sharing the information from the JFACC's sensors as well as the information about related decisions. This blends with the JV 2010 vision and the Air Force's plans for Dynamic Aerospace Command or DAC (Dodgen , 1999). These concepts use networked organizations to provide flexibility and share information through high tech systems.

With JV2010 and DAC concepts, the biggest limiting factor is always the size of the pipeline for information flow. This bandwidth limitation is mitigated by a consolidated dispatch center. Because the dispatch center is permanent, the investment in communications capability is not spent for each individual contingency. Instead of buying more expensive, less capable portable systems, mobility forces can focus on large bandwidth lines into and out of one location. Mobility forces still have a networked Global Grid with Global awareness, but the network flows between distributed decision makers through one information and execution center.

The consolidated dispatch center also addresses several lessons learned from previous wars. The dispatch center reduces "the strategic-tactical duplication of theater C2 facilities" (Devereaux, 1994:20). As the aircraft communication equipment links the crew and the dispatch center, local C2 is reduced to a local expert for coordinating support issues. Both the strategic and

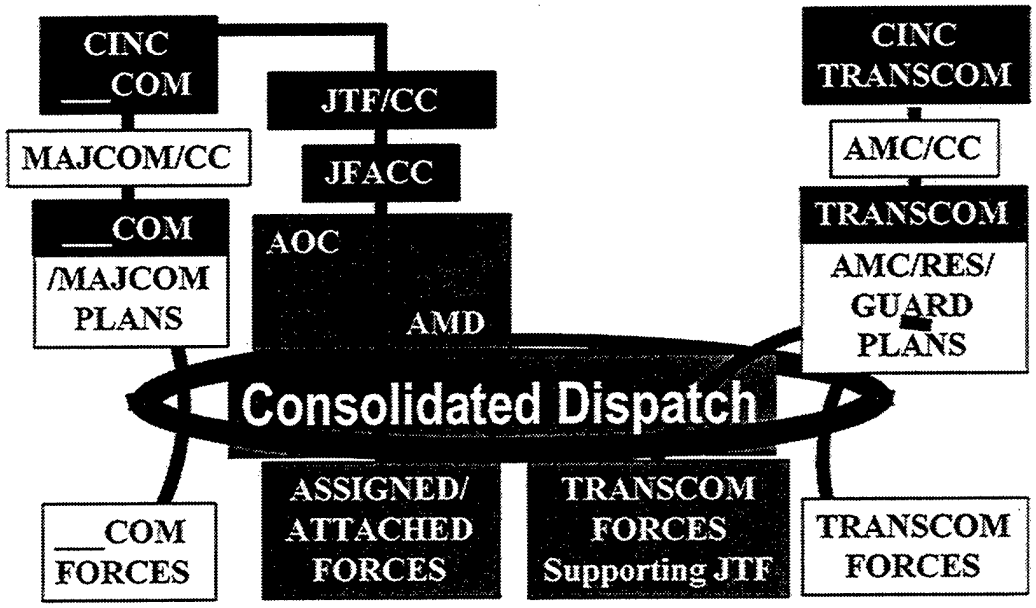

Figure 12. Elimination of Duplication through a Consolidated Dispatch Center

theater C2 functions flow through the consolidated dispatch center. A large contingency operation no longer "requires a deployable cadre of qualified C2 personnel" (Devereaux, 1994:20) because the command and control flows through the dispatch center. This system also creates a mechanism for the "judicious use of strategic airlift in-theater when needed to supplement the tactical effort" (Devereaux, 1994:20) by incorporating less personality driven TACON scenarios. Allowing a C17 to support a theater requirement no longer limits TRANSCOM'S ability to recall the aircraft, because the crew has not changed operational control (CHOPPED). The mission is TACON to the dispatch center to manage for a specific mission. The CINC has not given away tomorrow's ability to respond to a problem.

Disadvantages of a Consolidated Dispatch Center

Just as the CINC's are reluctant to give up control over specific forces for fear they might not be able to get them quick enough in times of crisis, mobility managers will be reluctant to give up control of their data entry. A commander has less direct power when some of the functions associated with their mission are not located within "walking distance." The power to reach out and touch a poor performer declines as the distance increases. With dispatchers several time zones away from the commander, a consolidated dispatch center will not appeal to many. Although this can be overcome with improved communication equipment and training, it will be difficult to convince some of return on their investment in the new process.

Consolidating the dispatch functions into one location will increase demands on the quality and experience of theater mobility planners. As the distance between the planners and the dispatchers grows, the requirement for clear communication of ideas grows. The experts must be more capable of zero defects planning. Again, communication improvements and training can offset this disadvantage. This type of structure enables effective operations based on local expertise and efficiencies of a consolidated dispatch center.

JFACC Scenario with a Consolidated Dispatch Center

For the Yugoslavia scenario, the theater experts would deploy with the JFACC and the AOC. The consolidated dispatch center not only shares information with the aircraft and crews on mobility missions, but also sensor information through the JFACC's network. As the dispatchers monitor missions within the JFACC's AOR, they cross check information on the JFACC's net. The active SAM information alerts the dispatcher and the C17 crews to the situation. While the JFACC is making the decision, the dispatcher and crews are also considering options such as how long they can hold based on their fuel status. When the JFACC direction comes through, the nodes are marching in step with the same information. Figure 13 shows how the JFACC's direction to hold the C17s follows the same path as one to hold the C130s because the control of C2 comes from the same organization.

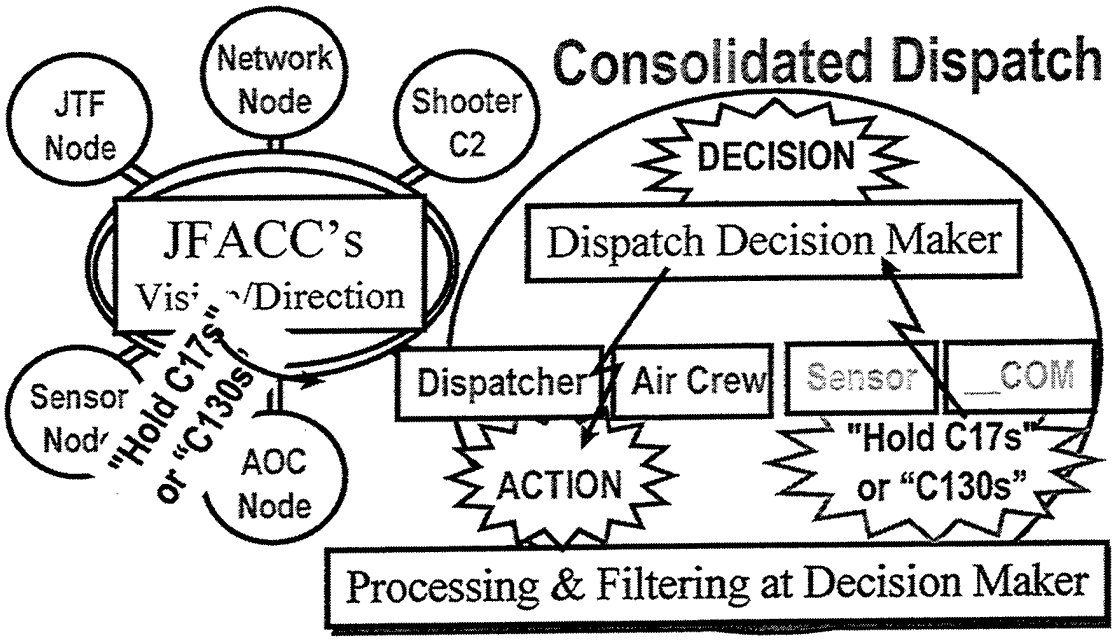

Figure 13. JFACC's "Hold" Decision travels network through a Consolidated Dispatch to Aircrew

VI. Recommendations

The following recommendations address the research questions raised in the first chapter. Hopefully, these issues raise awareness and stimulate discussions so the Air Force can work toward the capabilities in JV 2010 and AF 2025 rather than revive legacy systems and organizations. The plan needs to be based on future mobility requirements, which indicate a greater demand for efficient and effective operations.

Through the research on organizational structures, it is apparent that large organizations are taking advantage of networked structures to provide efficiencies of scale while providing flexibility for localized situations. So, what structure maintains air mobility forces local command and control effectiveness while making efficient use of their resources? A network that links a consolidated dispatch center to distributed decision-makers. To this end, the Air Force should merge its three separate dispatch efforts into one consolidated plan and location. Just as the military now contracts out for several functions, the Air Force could eventually use civilian dispatchers under military leadership to take full advantage of the data link communications being added to the mobility aircraft fleet. The consolidated dispatch center would relieve pressures on the AMOCC by eliminating the data entry and mission management requirements. The theater experts could focus on mission planning and improving air mobility support for the CINCs.

The research also points to the inability of one command and control organization to effectively manage mobility assets around the globe. Theater expertise will grow in importance as the demands on air mobility grow. To this end, mobility experts must remain in theater and continue to make inroads in the MAJCOM's and CINC's staffs. This enables people based near the decision-maker to provide educated recommendations to the theater hierarchy as well as relay the CINC's vision and direction to the consolidated dispatch center. For the TRANSCOM missions to EUCOM's AOR, the EUCOM and USAFE mobility experts share the same network of information as the centralized dispatch center managing the mission for TRANSCOM. The best organization to direct the "strategic missions" supporting "theater requirements" is the combined expertise and consolidated communications resource. ACOM, CENTCOM, and SOUTHCOM mobility should operate in this manner as well, by incorporating a greater number of mobility experts into their staffs. The network enables one system the ability to provide local direction and global management in a consistent format for the aircrews.

The consolidated dispatch center also alleviates the issue of hierarchy between the theater and global command and control systems. Because the planning function remains with the CINC's command structure, the theater or TRANSCOM does not relinquish command of their resources. The centralized dispatch center manages the plan for the commanding organization. The networked organization is not hierarchical in itself, but rather data linked and sharing information.

The research also shows that the Air Force need not pay the manpower and equipment bills for three separate control centers. By consolidating the dispatch function, the Air Force can relocate manpower positions and reduce system requirements, similar to the commercial airline operations centers' savings. The planning manpower positions need to be incorporated into the theater's MAJCOM and CINC staffs. The data entry and mission management positions could be moved to areas with personnel shortfalls, such as those affected by the May 1999 "Stop Loss" message.

Finally, the idea of a consolidated dispatch center data linked to the theater planners' or JFACC's network mirrors the AF Dynamic Aerospace Command concept of networked C2 centers. By sharing information, these networked organizations can manage problems simultaneously rather than sequentially. Not only does this concept speed the decision process, but it also enables rear based organizations flexibility to mitigate local intricacies with theater expertise.

VII. Conclusions

As with any new system, a consolidated dispatch operation will take time to reach its full potential. Many people look to the past to find solutions to current problems. The current three mobility control centers reflects the 1980's structure. Rather than look to the past to apply the improving communications capability, the Air Force needs to focus on the future needs outlined in its own research. Immediate plans for investing in three mobility control centers do not match Joint Vision 2010 and Air Force 2025 perspectives.

"As the United States Air Force enters the 21st Century, it is transitioning from a strategy of forward presence to a force projection capability. This strategy has been adopted by the U.S. military as a whole and therefore, places a heavy reliance on the airlift capability of the United States Air Force" (Mordente, 1999:v). With the addition of GATM communications equipment, the Air Force must reconcile the difference between centralized control for efficiency and decentralized control for effectiveness. Simply adding communications equipment does not go far enough. The existing command and control organizations must be modified to take full advantage of technological improvements to meet the increasing demands on air mobility forces. Rather than blindly invest in facility based equipment, the Air Force needs a plan based on the total system needs.

A network organization balances the need for decentralized control with the most efficient use of the communications equipment to link the decision makers to the execution assets. Instead of investing in multiple independent command and control centers, the Air Force should consolidate its mobility dispatch functions into one location. One consolidated dispatch center provides the benefits of economies of scale and the one stop shop for the warfighter. The consolidated dispatch center does not eliminate the theater mobility planning staff. Rather, it allows the theater mobility experts to focus on improving the integration and results of the mobility effort for the CINC without the data entry work of the dispatching center. As world events grow increasingly more complex, the Air Force must capitalize on improvements in technology with more innovative organizational structures. The end result will be improved combat effectiveness as well as budget efficiency for future air mobility operations. Anything less increases the risk of failure.

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About the Author

Major Jeffrey L. Hupy is a senior pilot with over 2,200 hours of flying time. His past assignments include T-37 instructor pilot and wing scheduler at Vance AFB, Oklahoma; C-5 instructor pilot and PHOENIX PORT officer at Dover AFB, DE; as well as a contingency director and mission support deputy division chief in the Tanker Airlift Control Center (TACC) Scott AFB, Illinois. He is a 1986 graduate of the Air Force Academy with a Bachelor of Science degree. Following graduation from the Advanced Study of Air Mobility (ASAM), Major Hupy will attend Air Command and Staff College at Maxwell AFB, Alabama.

REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 99	Master's Graduate Research Paper

4. TITLE AND SUBTITLE
COMMAND AND CONTROL OF MOBILITY FORCES:
ANALYSIS OF THE ORGANIZATIONAL STRUCTURE

5. FUNDING NUMBERS

6. AUTHOR(S)
Major Jeffrey L. Hupy

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Air Force Institute of Technology
2750 P Street
WPAFB OH 45433-7765

8. PERFORMING ORGANIZATION REPORT NUMBER
AFIT/GMO/LAC/99E-6

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Air Force Institute of Technology
2750 P Street
WPAFB OH 45433-7765

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
AFIT/GMO/LAC/99E-6

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Documents such as Joint Vision 2010 and Air Force 2025 outline military capabilities which the US will need to address National Interests in the near future. Most of these papers espouse decentralized control as a means to improve decision-making speed. As the USAF adds Global Air Traffic Management's required communications equipment to its mobility fleet, they must reconcile the difference between centralized control for efficiency and decentralized control for effectiveness. The existing command and control (C2) organizational structure must be modified to leverage the technological advantages. Rather than blindly invest in facility based equipment, the AF needs a plan based on the total system needs.

A network organization balances the need for decentralized control with the most efficient use of the communications equipment to link the decision makers to the execution assets. Instead of investing in multiple C2 centers, the AF should consolidate its mobility dispatch functions into one location. One consolidated dispatch center provides the benefits of economies of scale and a one stop shop for the warfighter. The consolidated dispatch center does not eliminate the theater mobility planning staff. Rather, it allows the theater mobility experts focus on improving the integration and results of the mobility effort for the CINC without the data entry work of the dispatching center.

14. SUBJECT TERMS
Joint Vision 2010, Air Force 2025, Global Air Traffic Management, network organization, decentralized control, one stop shop for the warfighter, mobility effort, command and control, C2

15. NUMBER OF PAGES
58

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

AFIT Control Number AFIT/GMO/LAC/99E-6

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